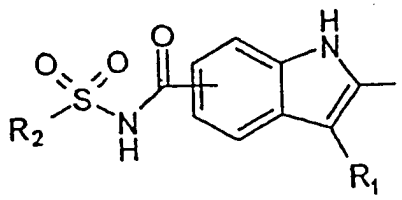
Claims

1. An indole derivative represented by formula (I) or a salt thereof:



(I)

wherein R_1 represents an aryl lower alkyl group, said aryl group may be substituted with one or more groups selected from the group consisting of a halogen atom, an aryl group, a heterocyclic group, an aryl lower alkyl group, an aryl lower alkenyl group, a halo-lower alkyl group, a lower cycloalkyl-lower alkoxy group, a lower cycloalkoxy-lower alkyl group, an aryl lower alkynyl group, an aryloxy lower alkyl group, an aryl lower alkoxy group, a lower alkylthio group, a lower alkoxy group, and an alkenyl group; and R_2 represents a lower alkyl group, a lower alkenyl group, an aryl group, or a heterocyclic group, each of which may be substituted with a hydrogen atom, a lower alkyl group, a lower alkenyl group, or an aryl group.

2. The indole derivative or a salt thereof according to claim 1, wherein R_1 is a halo-aryl lower alkyl group, said aryl group may be substituted with a halo-lower alkyl group, a lower cycloalkyl lower alkoxy group, a lower cycloalkoxy lower alkyl group, an aryl lower alkynyl group, an aryloxy lower alkyl group, a lower alkylthio group, a lower alkoxy group, or a lower alkenyl group.

3. The indole derivative or a salt thereof according to claim 1, wherein said derivative is selected from the group consisting of 3-(2-chloro-4-(t-butylthio)benzyl)-2-methyl-5-(1-pentane-sulfonylcarbamoyl)indole, 3-(2-chloro-4-(t-butylthio)benzyl)-2-methyl-5-(4-methylbenzene)sulfonylcarbamoyl)indole, 3-(2-chloro-4-iodo-benzyl)-2-methyl-5-(1-pentanesulfonylcarbamoyl)indole, 3-(2-chloro-4-iodobenzyl)-2-methyl-5-((4-methyl-benzene)sulfonyl-carbamoyl)indole, 3-(2-chloro-4-(phenylethynyl)benzyl)-2-methyl-5-(1-pentanesulfonylcarbamoyl)indole, 3-(2-chloro-4-(phenyl-

ethynyl)benzyl)-2-methyl-5-((4-methylbenzene)sulfonylcarbamoyl)-indole, 3-(2-chloro-4-(2-phenylethenyl)benzyl)-2-methyl-5-((4-methylbenzene)sulfonylcarbamoyl)indole, 3-(2-chloro-4-(2-phenylethenyl)benzyl)-2-methyl-5-(1-pentanesulfonylcarbamoyl)indole, 3-(2-chloro-4-(2-phenylethyl)benzyl)-2-methyl-5-((4-methylbenzene)sulfonylcarbamoyl)indole, 3-(2-chloro-4-(benzyloxy)-benzyl)-2-methyl-5-((4-methylbenzene)sulfonylcarbamoyl)indole, 3-(2-chloro-4-(cyclohexylmethyloxy)benzyl)-2-methyl-5-((4-methylbenzene)sulfonylcarbamoyl)indole, 3-(2-chloro-4-phenylbenzyl)-5-((5-chloro-2-thiophenesulfonyl)carbamoyl)-2-methylindole, 3-(2-chloro-4-phenylbenzyl)-5-((5-bromo-2-thiophenesulfonyl)carbamoyl)-2-methylindole, 3-(2-chloro-4-phenylbenzyl)-2-methyl-5-(4-pentenesulfonylcarbamoyl)indole, 3-((1-bromonaphthalen-2-yl)methyl)-5-((5-chloro-2-thiophenesulfonyl)-carbamoyl)-2-methylindole, 3-((1-bromonaphthalen-2-yl)methyl)-5-((5-bromo-2-thiophenesulfonyl)carbamoyl)-2-methylindole, 3-(4-bromo-2-chlorobenzyl)-2-methyl-5-((4-methylbenzene)sulfonyl-carbamoyl)indole, 3-(4-bromo-2-chlorobenzyl)-2-methyl-5-((4-vinylbenzene)sulfonylcarbamoyl)indole, 3-(4-bromo-2-chloro-benzyl)-2-methyl-5-((2-phenylethenyl)sulfonylcarbamoyl)indole, 3-(4-bromo-2-chlorobenzyl)-2-methyl-5-((1-pentene)sulfonyl-carbamoyl)indole, 3-(4-bromo-2-chlorobenzyl)-5-((5-bromo-2-thiophenesulfonyl)carbamoyl)-2-methylindole, 3-(4-bromo-2-chlorobenzyl)-2-methyl-5-(4-pentenesulfonylcarbamoyl)indole, 5-((5-chloro-2-thiophenesulfonyl)carbamoyl)-3-(2,4-dichloro-benzyl)-2-methylindole, 5-((5-bromo-2-thiophenesulfonyl)-carbamoyl)-3-(2,4-dichlorobenzyl)-2-methylindole, 3-(2-chloro-4-(trifluoromethyl)benzyl)-2-methyl-5-(1-pentanesulfonyl-carbamoyl)indole, 3-(2-chloro-4-(trifluoromethyl)benzyl)-2-methyl-5-(4-methylbenzenesulfonylcarbamoyl)indole, 3-(2-chloro-4-(trifluoromethyl)benzyl)-2-methyl-5-((5-chloro-2-thiophene-sulfonyl)carbamoyl)indole, 3-(2-chloro-4-(trifluoromethyl)-benzyl)-2-methyl-5-((5-bromo-2-thiophenesulfonyl)carbamoyl)-indole, 3-(2-chloro-4-(trifluoromethyl)benzyl)-2-methyl-5-((4-vinylbenzene)sulfonylcarbamoyl)indole, 3-(2-chloro-4-(trifluoro-

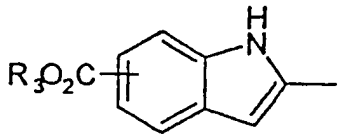
methyl)benzyl)-2-methyl-5-((2-phenylethenyl)sulfonylcarbamoyl)-indole, 3-(2-chloro-4-(trifluoromethyl)benzyl)-2-methyl-5-((1-pentene)sulfonylcarbamoyl)indole, 3-(2-chloro-4-(phenoxymethyl)-benzyl)-2-methyl-5-(1-pentanesulfonylcarbamoyl)indole, 3-(2-chloro-4-(phenoxymethyl)benzyl)-2-methyl-5-(4-methylbenzene-sulfonylcarbamoyl)indole, 3-(2-chloro-4-(cyclohexyloxymethyl)-benzyl)-2-methyl-5-(1-pentanesulfonylcarbamoyl)indole, 3-(2-chloro-4-(cyclohexyloxymethyl)benzyl)-2-methyl-5-(4-methyl-benzenesulfonylcarbamoyl)indole, 3-(2-chloro-4-ethoxybenzyl)-2-methyl-5-(4-methylbenzenesulfonylcarbamoyl)indole, 3-(2-chloro-4-ethoxybenzyl)-2-methyl-5-(1-pentanesulfonylcarbamoyl)indole, 3-(2-chloro-4-(thiophen-2-yl)benzyl)-2-methyl-5-(4-methyl-benzenesulfonylcarbamoyl)indole, 3-(2-chloro-4-(thiophen-2-yl-)benzyl)-2-methyl-5-(1-pentanesulfonylcarbamoyl)indole, 3-(2-chloro-4-(furan-2-yl)benzyl)-2-methyl-5-(1-pentanesulfonyl-carbamoyl)indole, 3-(2-chloro-4-(furan-2-yl)benzyl)-2-methyl-5-(4-methylbenzenesulfonylcarbamoyl)indole, 3-(2-chloro-4-(1-hexen-2-yl)benzyl)-2-methyl-5-(4-methylbenzenesulfonyl-carbamoyl)indole, 3-(2-chloro-4-(1-hexen-1-yl)benzyl)-2-methyl-5-(4-methylbenzenesulfonylcarbamoyl)indole, 3-(2-chloro-4-(1-hexen-2-yl)benzyl)-2-methyl-5-(1-pentanesulfonylcarbamoyl)indole, and 3-(2-chloro-4-(1-hexen-1-yl)benzyl)-2-methyl-5-(1-pentane-sulfonylcarbamoyl)indole.

4. A pharmaceutical composition for preventing and treating impaired glucose tolerance, diabetes, diabetic complications, syndrome of insulin resistance, polycystic ovary syndrome, hyperlipidemia, atherosclerosis, cardiovascular disorders, hyperglycemia, hypertension, pulmonary hypertension, congestive heart failure, glomerulopathy, tubulointerstitial disorders, renal failure, angiostenosis, distal angiopathy, cerebral apoplexy, chronic reversible obstructions, autoimmune diseases, allergic rhinitis, urticaria, glaucoma, diseases characterized by enteromotility disorders, impotence, nephritis, cachexia, pancreatitis, or restenosis after PTCA, which comprises, as an active ingredient, the indole derivative or a salt thereof according to any

one of claims 1 to 3.

5. A method of producing the indole derivative of claim 1, the method comprising the steps of:

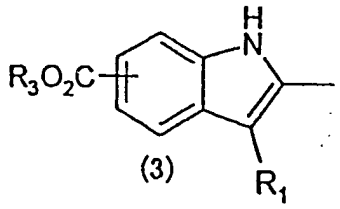
(a) reacting a compound of formula (2):



(2)

wherein R_3 represents a lower-alkyl group, with haloid or silane, and aldehyde corresponding to R_1 (R_1 has the same meaning as in claim 1);

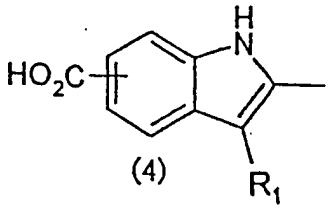
(b) hydrolyzing a compound of formula (3) obtained in step (a):



(3)

wherein R_1 has the same meaning as in claim 1; and

(c) reacting a carboxyl group-activating agent and subsequently sulfonamide with a compound of formula (4) obtained in step (b):

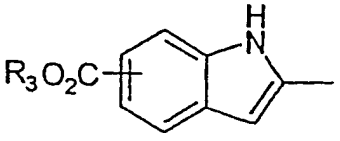


(4)

wherein R_1 has the same meaning as in claim 1.

6. A method of producing the indole derivative of claim 1, the method comprising the steps of:

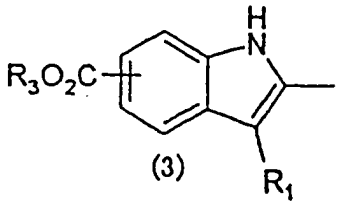
(a) reacting a compound of formula (2):



(2)

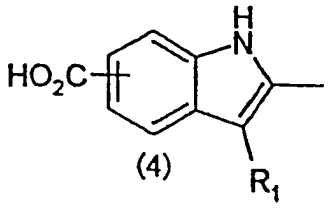
wherein R_3 represents a lower-alkyl group, with haloid or silane, and aldehyde corresponding to R_1 (R_1 has the same meaning as in claim 1);

(b) hydrolyzing a compound of formula (3) obtained in step (a):



wherein R_1 has the same meaning as in claim 1;

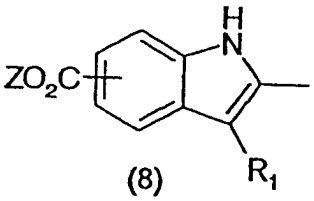
(g) reacting a halogenating agent with a compound of formula (4) obtained in step (b):



(b)

wherein R_1 has the same meaning as in claim 1; and

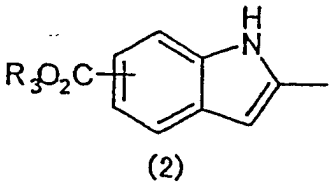
(h) reacting sulfonamide with a compound of formula (8) obtained in step (g):



wherein Z represents a halogen atom and R_1 has the same meaning as in claim 1.

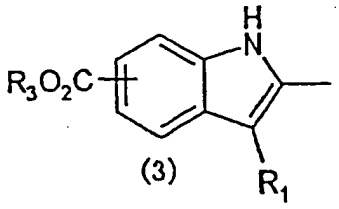
7. A method of producing the indole derivative of claim 1, the method comprising the steps of:

(a) reacting a compound of formula (2):



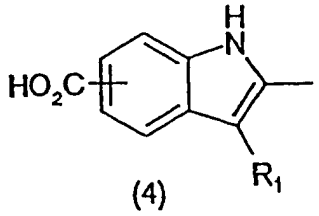
wherein R_3 represents a lower-alkyl group, with haloid or silane, and aldehyde corresponding to R_1 (R_1 has the same meaning as in claim 1);

(b) hydrolyzing a compound of formula (3) obtained in step (a):



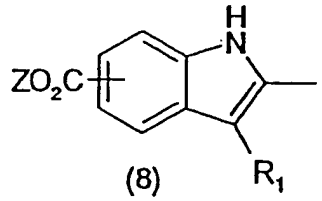
wherein R_1 has the same meaning as in claim 1;

(g) reacting a halogenating agent with a compound of formula (4) obtained in step (b):



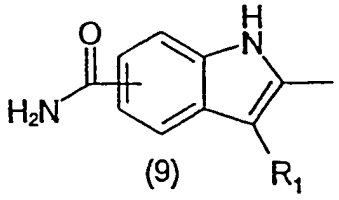
wherein R_1 has the same meaning as in claim 1;

(i) reacting ammonia or aqueous ammonia with a compound of formula (8) obtained in step (g):



wherein Z represents a halogen atom and R_1 has the same meaning as in claim 1; and

(j) reacting sulfonylhalide to a compound of formula (9) obtained in step (i):



wherein R_1 has the same meaning as in claim 1.